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INFORMATION ON SOVIET BLOC INTERNATIONAL GEOPHYSICAL COOPERATION - 1959

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INTERNATIONAL GEOPHYSICAL COOPERATION PROGRAM-- SOVIET-BLOC ACTIVITIES

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I. GENERAL

Czech Work on Ellipsoid of the Earth From European Astronomical-Geodetic Networks

A description is given of a determination of the ellipsoid of the earth in the general area of Europe, extending from the Mediterranean Sea to the Arctic Ocean and west of 30 degrees East longitude. A total of 708 astronomical-geodetic points of the astronomical-geodetic networks of 22 countries, represented primarily in the Central European Network and the Baltic Network, were used for this determination by the Czechoslovak Research Institute of Geodesy, Topography, and Cartography during 1956, 1957 and 1958. This represents a continuation of studies carried out under the direction of A. A. Izatov at the Central Scientific Research Institute of Geodesy, Aerial Surveying, and Cartography in Moscow.

The determination of the major semiaxis was done by both a translative and a projective method, the results of which are in satisfactory agreement. The results obtained in this work are considered a confirmation of the validity of using the Krassowski ellipsoid as a reference ellipsoid.

The ellipsoid parameters are in closest agreement with those derived by Liebermann (Bull. geod., No 37, 1955), which is of particular interest because Liebermann used a completely different method from that employed here. ("The Dimensions of the Ellipsoid of the Earth from the European Astronomical-Geodetic Nets," by M. Bursa, Prague; Berlin, Vermessungstechnik, No 4, Apr 59, pp 77-80, 86)

Interview With Dr Ludmila Pajdusakova-Mrkosova

Dr Ludmila Pajdusakova-Mrkosova, Czech scientist, gave the following information on IGY work in the Institute of Astronomy of the Slovak Academy of Sciences, in a recent interview.

The Institute of Astronomy of the Slovak Academy of Sciences, at its station on Skalnate Pleso, is conducting work along three lines in accordance with the IGY program. These works include meteor material research, the observation of artificial earth satellites, and research in solar activity. The first of these disciplines was brought into the program in 1959, when the IGY program was continued in the framework of "International Geophysical Cooperation." Solar research, as well as observation of artificial earth satellites, will continue after the IGY is over. In the IGY program, the station reported the daily sun spot numbers

and satellite positions each evening to the IGY alert center in Fruhonice. A. Mrkos, at the Lomnicky Stit station, did research on airglow under the IGY program and will continue this work. His observations will be the more significant, since they are being conducted over a wide area, extending from 80 degrees South latitude, through the equator, and as far north as Leningrad.

The Institute of Astronomy station on Lomnicky Stit, which began operations in fall 1943, has made many contributions in discovering and plotting new comets. It has published the Atlas Coeli Skalnate Pleso, a map of the northern and southern skies, to which another atlas, the Atlas Aclipticalis, mapping only part of the sky at the equator but containing more stars than the Atlas Coeli, has recently been added. The station has been highly praised for its work on meteors. Zurich, the center for the observation of the Sun's photosphere, has valued the station's work in solar observation. Research on variable stars is also developing rapidly.

The station's tasks are all of a long term nature. Some, as the study of variable stars, will require several years. A worker may be sent to the French Sudan to observe a solar eclipse.

The observatory on Lomnicky Stit, the highest in Europe, may become a joint work center in which scientists from Berlin, Warsaw, Budapest, Bucharest, Moscow, or Prague and Bratislava, would be admitted on an equal footing. Lomnicky Stit has all the prerequisites for becoming an international institute in the framework of the socialist states. An East German Academy scientist has already worked at the station. A Polish worker is there now.

The building on Lomnicky Stit is now being expanded, and construction will be completed as soon as weather permits. A Wilson cloud chamber is now being installed. Zeiss Jena will deliver a coronagraph and its housing dome in 1960. The construction of an institute for physics, astronomy, and meteorology in Tatranska Lomnica is being considered for the future.

Concerning Moon flights, Dr Mrkosova says that a Moon flight by the Soviets would very quickly equalize the international situation, securing peace.

Finally, Dr Mrkosova states that she regrets that so few women are engaged in scientific research work. ("Our Conversation With Dr Ludmila Pajdusakova-Mrkosova"; Bratislava, Priroda a Spolocnost, No 5, 1959)

II. ROCKETS AND ARTIFICIAL EARTH SATELLITES

Tracking Station Completed in Hungary

A photograph in the source has the caption "First Hungarian artificial moon-tracking station." The project was commissioned by the space travel committee of the Academy of Sciences USSR [Interdepartmental Commission on Interplanetary Communications]. The antenna, which is 29 meters tall, will be ready shortly for picking up signals. The installation is located in Rakosliget. ("First Hungarian Artificial Moon-Tracking Station"; Budapest, Esti Hirlap, 8 Apr 59, p 3)

III. UPPER ATMOSPHERE

Study on Night Sky Spectra in 8,200-11,200-Angstrom Range

During the winter of 1956-1957, at the Byurakan Observatory (40° 21' N; 44°15' E), spectra of the night sky, in the wave length range of 8,200 — 11,200 angstrons were recorded by means of an SP-50 spectrograph with an electron optical transformer. The dispersion of the spectrograph was 160 angstroms per millimeter and the resolution, 7 angstroms, which was sufficient for obtaining OH spectra with an R-branch.

An average intensity distribution of the OH bands was obtained for several nights for each of the five series of spectra recorded. The relative intensity of the OH bands varied by 10-30 percent from night to night; thus, the average intensity distribution for several nights was obtained with an accuracy of 10-15 percent, even though the error of a single measurement did not exceed 10 percent. Assuming that, for such an accuracy, the population level does not change from night to night, a group of overlapping spectra were tied in together, each for a different time. Thus, the average distribution of intensity in the overlapping bands was within the limits of the measurement error; because of the "tying-in" of the several spectra, the error in the determination of the relative intensity of the OH bands did not increase appreciably.

The absolute intensities of the OH bands were determined with a second-order green line obtained in one of the series of spectra. The intensity of the green line increased almost threefold in the course of 5 nights, but these changes did not correspond to the intensity of the OH bands. For this reason, the average values of the intensity of the OH bands in units of 5,577 angstroms were obtained with an accuracy of up to 50%.

Within the limits of error, the temperature measurements for various bands proved to be equal. This is considered an indication that the rotational temperature of the OH molecule reflects the temperature of the medium.

A definite latitudinal effect on temperature, already pointed out by Chamberlain and Oliver (Phys. Rev., 90, 1953, p 1118), is confirmed ("Spectra of the Night Sky in the 8,200-11,200 Angstrom Range," by N. I. Fedorova, Institute of the Physics of the Atmosphere, Academy of Sciences USSR; Moscow, Doklady Akademii Nauk SSSR, Vol 125, No 3, 21 Mar 1959. pp 535-537)

Jupiter's Mysterious Radio Signals

Radio signals from the planet Jupiter are one of the unsolved riddles of radio astronomy. The true nature of these signals is yet to be explained. An article by V. Komarov, which appeared in the Soviet newspaper Vodnyy Transport, has this to say on the subject:

Early in 1955, a previously unknown, intense source of radio emissions on the 13.5 meter wave length was discovered with the aid of a highly sensitive radiotelescope. In nature, it differed very sharply from other similar sources. This radiation was extremely irregular and consisted of a series of short "splashes," very much like the "splashes" of radio emission caused by lightning discharges in the Earth's atmosphere.

Before long, a still more curious phenomenon was observed. It appeared that the new source was changing its position relative to the stars. This implied that it was located very near, and perhaps even within the limits of the solar system.

In fact, in a short time, there was success in establishing that the singular source of cosmic radio emission was none other than the planet Jupiter.

At first glance, it may seem strange that radio emission from Jupiter was not noticed earlier. However, this can be easily explained by its similarity to that of lightning. It is possible that scientists had received these "radio transmissions" from Jupiter earlier but paid no attention to them, assuming they were the usual atmospheric noises.

Only two such "radio stations" were known up to now within the limits of the solar system -- the Sun and the Moon. Radio emission from the Sun on meter wave lengths is caused by complex physical processes originating in the outer part of the solar atmosphere, the so-called corona.

As regards the Moon, it emits radiowaves as a result of the heating of its surface by the Sun's rays. Thus the lunar "radio station" is very weak.

In the case of Jupiter, the matter is entirely different. Being at an enormous distance from the Sun, it receives little heat. It is known, for example, that the temperature of the upper layer of the clouds in Jupiter's atmosphere is about minus 110 degrees Centigrade. Therefore, the thermal radio emission of Jupiter is so weak that present radio-astronomical apparatus cannot detect it.

About 2 years ago, a curious proposal was made in this regard. It connects Jupiter's radio emission with storm phenomena originating in its atmosphere. Actually, the hydrogenous atmosphere of the gigantic planet contains numerous clouds consisting, evidently, of droplets of methane and crystalline particles of ammonia.

There is no doubt that such clouds, if they actually exist, are capable of accumulating electric charges, which can sometimes lead to the formation of lightning discharges.

The storm hypothesis is rather convincing. However, a succession of new data was recently obtained which not only does not clarify the problem but, on the contrary, still further confuses it.

First, it appears that the strongest emission of radio waves always comes from one and the same spot on the planet. Secondly, on the basis of a whole series of observational data, the theory has been expressed that the source of radio waves lies on the surface of the planet, considerably below the cloud layer.

However, the very nature of Jupiter's radio emissions still remains unexplained at present.

It is necessary to expect that the possibility of studying cosmic radio waves outside the Earth's atmosphere using cosmic rockets and artificial earth satellites will, in the not-too-distant future, aid in solving the nature of the mysterious radio signals. ("Radio Transmissions from Jupiter," by V. Komarov; Moscow, Vodnyy Transport, 14 Mar 59, p 4)

An unusually bright blueish-green light, lasting several seconds, was observed in the sky over Czechoslovakia around 2030 hours on Tuesday, 7 April 1959. The light was accompanied by the sound of distant thunder. The article in the source continues as follows: "Incidental observers felt that this may have been an ordinary rocket. However, scientists have found something else -- an extremely rare natural phenomenon. Over the territory of Bohemia, a giant meteor burned out.

The Ondrejov observatory maintains a number of automatic devices for photographic observation of the sky. Thus, the observatory was successful in making photographs, albeit only two, of the phenomenon. It is clear that the meteor was of extraordinary size and was traveling from east to west. Its height is difficult to estimate, but more data will be available in the next few days, since the scientists are relying on information from incidental observers. Citizens are requested to send any and all information on the sighting to the Astronomical Institute at Ondrejov.

The scientists at the observatory have told the press that it is quite possible the meteor may not have burned up completely and that parts of it may have fallen to the ground somewhere in Bohemia. Consequently, after all incoming information is evaluated, a thorough search will be conducted. Commenting on the information so far available, the scientists feel that of all the reports, one from Caslav is the best. In it, an observer claims to have seen a bright object in the constellation of Orion on the night in question. At Ondrejov, the phenomenon was observed more or less accidentally. One of the scientific workers engaged in observing the planet Uranus saw the bright light through the opening in the observatory cupola.

The workers at the Ondrejov Observatory state that the flight of meteors is nothing unusual -- such bodies fall to earth regularly throughout the night. Occasionally, there is one as bright as a planet of our solar system. However, the celestial body which illuminated the night sky on the night in question did arouse the interest of scientific workers and other observers.

"Will the Remains of a Large Meteor be Found," Prague, Obrana Lidu, 9 Apr 59, p 1)

"Cosmic Tower" Proposed by Soviet Scientist

The Italian newspaper L'Unita carries an item from Moscow, from its special correspondent, Maurizio Ferrara, describing a "cosmic tower" proposed by Prof Pokrovskiy, Doctor of Technical Sciences, as a means of studying the upper atmosphere.

The proposed tower, some 100 kilometers in height, would be the most simple and sure means of systematically exploring cosmic space. At this height, atmospheric pressure is one millionth of that at ground level. Such pressure equals that of a vacuum necessary for conducting a number of space experiments and studies.

A tower of this type would be impossible to construct using ordinary materials. The only possibility would be the employment of the "aerostatic architecture" method. Pokrovskiy proposes the use of light materials, plastics, supported, not by a rigid structure, but by a mass of gas, as are balloons. Pokrovskiy proposes the construction of an immense funnel, the largest part of which would be the base resting on the Earth, and the narrowest part being the top of the tower.

Filled with gas lighter than air, Pokrovskiy's funnel would remain in a vertical position. He maintains that it would be perfectly stable.

Basing his calculations on the pressure of the gas (hydrogen or helium), Pokrovskiy says that on the top of such an aerostatic tower, having an upper diameter of 10 meters, a weight of 190 tons could be arranged, supported by the pressure of the column of gas inside the tower.

If the tower were filled with helium-hydrogen-filled balloons incapable of carrying instruments to such great heights under ordinary conditions, could easily do this inside the tower.

The article, according to Ferrara, appeared in the Soviet technical periodical Tecnica [sic]. The article included a drawing depicting a tower 160 kilometers in height, with a terminal "chamber" 390 meters in diameter capable of supporting a load of 260,000 tons [sic]. This tower would require a circular base 100 kilometers in diameter. ("A Soviet Scientist Proposes a 'Cosmic Tower' 100 Kilometers High," by Maurizio Ferrara; Rome, L'Unita, 8 May 59, p 8)

IV. GRAVIMETRY

New East German Pendulum Principle for Geodetic Instruments

After a brief historical survey of design principles and instruments now available for the measurement of plumb line deviations and for the stabilization of lines of sight, and a brief introduction to the problems of modern precision inclination measurements and automatic horizon adjustment, the author presents a detailed description of the theory and principle of operation of a new, so-called astatized, pendulum with a fixed axis of rotation. The characteristic feature of this pendulum is that, within a certain range, the relative inclination, with respect to that of the base line, is an arbitrarily adjustable, almost linear ratio, which is designated as "mechanical magnification." The upright pendulum is held in equilibrium by counterweights when the base of the pendulum is inclined. The magnification factor is determined by the geometric and mass ratios and remains constant if all geometric parameters and masses change in the same ratio. In the theoretical treatment, the formulas

are derived for the magnification factor as a function of the geometric and physical dimensions; the deviations from strict linearity are computed; and the errors induced by mechanically or thermally conditioned changes of the mechanical magnification are determined.

In the technical design, only spring hinged supports are considered for the fulcrums of the pendulum. The instantaneous axes of rotation of thin stressed wires and ribbons are computed, as is the deformation of such wires and ribbons in relation to the pendulum deflection, the magnification factor, and the geometric design ratios. Formulas are also given for a simple air-damping.

Results of tests and practical experiments on experimental models of the pendulum are also reported, according to which, the pendulum has a high degree of accuracy in balancing and return to balance, an excellent zero-point stability and, when certain design conditions are maintained, a high stability to resonance. The most important finding of the theoretical and practical research was that the accuracy of the pendulum is inversely proportional to the measurement range and the mechanical magnification.

The most difficult problems of design are in the hinged supports and the axes. It is found that, because of contradictory design requirements, it is not possible, on the basis of theory alone, to draw final conclusions on optimal designs. The principles of design presented here, however, are considered an adequate basis and guide for development work on the further refinement of precision geodetic instruments. ("A New Astatized Pendulum for Precise Inclination Measurements and Automatic Stabilization of Lines of Sight," by O. Hofmann; Jena, Jenaer Jahrbuch 1958, Part 1, pp 63-183)

V. OCEANOGRAPHY

Work of Soviet Expeditionary Ships Discussed by Member of Institute of Oceanology

An article on the equipment of Soviet expeditionary ships and the conduct of investigations with the aid of scientific instruments appears in the newspaper Sovetskiy Flot in response to a reader's question. The article is written by I. Stcyanov, chief of the fleet division of the Institute of Oceanology, Academy of Sciences USSR.

The Soviet Union has first-class expeditionary ships equipped with the latest scientific apparatus. Plying the oceans and seas are the ships, Vityaz', Ob', Lena, Mikhail Lomonosov, Sedov, Ekvator and Zarya. The ship Akademik Kovalevskiy conducted observations in the Mediterranean Sea. Many research ships of medium and low tonnage operate on the seas surrounding the Soviet Union and on the numerous inland water reservoirs, lakes, and rivers.

A wealth of scientific equipment is carried by the research ships Vityaz' and Makhail Lomonosov, which belong to the Academy of Sciences USSR. These have a water displacement of 6,000 tons.

Here, at the disposal of the scientists are convenient laboratory installations for research in the fields of hydrophysics, hydrochemistry geology, biology, etc. Each ship has up to 16 laboratories, in which 65-70 associates can work simultaneously.

The Vityaz' and the Lomonosov can undertake voyages lasting from 3 to 5 months. During one voyage, they can cover from 15,000 to 20,000 miles.

The expeditionary ships have an abundance of deck equipment. Winches of many types, designed and built in the USSR, make it possible to lower instruments, to anchor, and to conduct trawling operations at any depth. The powerful anchor winch on the Vityaz' was built by the staff of the Dynamo plant in Moscow and the imeni S. M. Kirov plant in Leningrad. Its cable drum holds 14 kilometers of steel cable, graduating from 14 to 25 millimeters in diameter. The weight of the cable alone is 15 tons.

With the aid of the anchor winch, the ship can conduct many days of observation anchored at a specific point regardless of the depth. The Vityaz' made one such deepwater anchoring in the region of Japan, where the depth of the water was 9,600 meters. The deepwater winch used for trawling is of similar construction to the anchor winch. With it, trawling was conducted at depths of 10,690 meters in the Tonga depression and 10,710 meters in the Mariana Trench. The winch was also used for obtaining soil cores almost 35 meters long with hydrostatic corers designed by N. N. Sysoyev and Ye. I. Kudinov.

A deep-water ocean winch was created for lowering instruments to great depths. Its drum held 12.5 kilometers of cable. Using this winch various instruments, bottom scoops, coring tubes, etc., were lowered to the very end of the cable. During one of the Vityaz' voyages, apparatus for underwater photography, designed by N. L. Zenkevich, was used to obtain pictures at a depth of over 10 kilometers.

At the disposal of oceanologists are "Okean" type winches which lower plankton and ichthyological nets, hydrological instruments, bottom scoops, soil corers, etc.

Thanks to new instruments and perfected observational techniques, Soviet scientists can, in briefer periods of time study larger areas and gather data enabling them to obtain precise results and make important generalizations. The velocities and directions of currents are measured with Yu. K. Alekseyev-type self-recording devices. These light and

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compact instruments can operate at depths of more than 1,500 meters for the period of a month. These self recorders are considered the best in the world. The Vityaz' recently completed its 29th voyage, during which a new model of the automatic current recorder for use at depths of 3,500 meters was tested. The Alekseyev instruments can be used only while the ship is standing at anchor or while drifting. Soviet scientists developed the electromagnetic current meter [EMIT] for measuring the velocity and direction of currents while under way.

A group of engineers of the Institute of Oceanology and the All Union Scientific Research Institute of the Fish Economy and Oceanography (VNIRO) developed electronic instruments, with the aid of which the trawl can be observed from on board the ship. This instrument increases the effectiveness of the fishing industry.

The investigation of bottom relief is a basic part of oceanographic work. During recent years, Soviet ships have made continuous records of bottom relief over hundreds of thousands of kilometers. The data collected made it possible to compile new batymetric charts which are a considerable improvement over the old ones. Studies of 12 of the 15 greatest known depths of the Pacific, conducted by Soviet scientists on the Vityaz', led to fixing the greatest of all known depths at 11,034 meters.

Special sonar fish locators greatly facilitate the detection of schools and increase catches.

Navigational instruments on the ships are used in a number of cases for conducting investigations. Into the circuit of the automatic electrocontact current-recorders, developed by Ye. I. Kudinov, an associate of the Institute of Oceanology, a gyrocompass repeater is connected, making it possible to obtain the true direction of the currents on the tape. The use of buoy stations was recently introduced into practice in hydrological investigations. Automatic self-recorders suspended from the buoy establish the speed and direction of currents at different levels. Ship's radar and radio also aid the scientists in their work on observations of drifting or anchored buoy stations.

An expeditionary ship is also a meteorological station. The latest models of meteorological equipment, including ship remote stations, are carried on board the Vityaz' and the Lomonosov.

The small research ships are equipped with numerous instruments. The Akademik S. Vavilov, with a displacement of 360 tons, carries three ocean winches, a deepwater anchoring device, gyrocompass, radar, four fathometers, etc. The work on the ships, small floating laboratories, sometimes involves great difficulties. The voyage of the expeditionary ship Geolog in Anadyrsk Bay and the Bering Sea is a good example of this. This ship, with a displacement of 54 tons, under the command of Capt A. M. Kavdeykin, traveled about 4,000 miles under the most difficult navigational conditions. Many scientific observations were conducted however.

Much of the material collected during the IGY has just now been published, but it may be safely said that the work performed by Soviet expeditionary ships has given important results. Several discoveries made it possible to arrive at highly significant conclusions. The rather rapid displacement of the waters in deep-water depressions, which was established by V. G. Bogorov and Ye. M. Kreps, corresponding members of the Academy of Sciences USSR, reveals as fully unsubtantiated and impractical the US proposal to use these depths for the disposal of radioactive wastes.

The scope of oceanographic investigations in the Soviet Union has broadened each year, says Stayanov. An ever-growing number of ships flying the pennant of the Academy of Sciences USSR is engaging in these operations. New scientific research stations are being built on the sea coasts, rivers, lakes, seas, etc., and oceanographic instruments and research techniques are being perfected. All new detachments of Soviet scientists and sailors are united in the important work of mastering the secrets of the seas and oceans in the interests of the national economy and navigation. These men are now taking part in the investigations according to the "International Geophysical Cooperation" program.

The successful fulfillment of the Seven Year Plan, designated by the 21st Party Congress, will make it possible to fit out Soviet expeditionary ships with still more highly perfected scientific apparatus.

("For Investigations on the Seas and Oceans," by I. Stayanov, chief of the fleet division of the Institute of Oceanology, Academy of Sciences USSR; Moscow, Sovetskiy Flot, 24 Mar 59)

VI. ARCTIC AND ANTARCTIC

Soviet Scientific Expeditions in the Arctic

Soviet scientists in the Arctic are now conducting complex scientific research to improve navigation facilities on the Northern Sea Route.

An air expedition, group sponsored by the Arctic and Antarctic Institute and headed by V. Kanaki, has been carrying out landings on the ice in various points of the Central Arctic. Members of the group have established drifting automatic radiometeorological stations and radio beacons and have conducted complex oceanographic observations.

Over a month has passed since a hydrographic expedition of Glavsevmorput' (Main Administration of the Northern Sea Route), headed by I. Chev'kalov, started working on Severnaya Zemlya. Polar workers with the help of airplanes, oversnow vehicles, and dogsleds, will cover the most remote points of the archipelago during their explorations.

Another hydrographic expedition, headed by P. Mikhaylenko, is continuing research activities, which were begun earlier on Zemlya Frantsa Iosifa. The work is being conducted in the straits and on a number of islands, including Ostrov Kheysa.

A new group of scientists left Leningrad recently for the Arctic. This group includes Doctor of Physicomathematical Sciences N. Kozyrev, astronomer of the Pulkovo Observatory, who recently discovered signs of volcanic activity on the moon. Before leaving for the Arctic, Kozyrev stated that he had been given the opportunity of verifying, in the northern latitudes, the theories concerning the existence of asymmetric forces active on the surface of the earth. These forces, which are always directed along the earth's axis, were studied by Kozyrev in the temperate zones of the Eastern Hemisphere. Now he will be able to measure them in the Central Arctic Basin.

Kozyrev and his assistant, astronomer V. Lobeysh, with the help of a special portable instrument designed by them, will conduct the necessary scientific research in different high-latitude regions. ("Today in the Arctic"; Moscow, Vodnyy Transport, 23 Apr 59)

Study of Icebergs Aids Navigation

On 22 December 1958, when the Ob' was on its way to the Antarctic and reached the 49th degree S, the first iceberg was encountered. More and more icebergs appeared as the ship sailed further south. In a few

days, at any time of the day or night, one could count from 30 to 80 icebergs simultaneously floating around the ship. The icebergs are the most typical element of the Antarctic water scene and are closely related to numerous phenomena taking place in the atmosphere and in the sea.

With the help of radar, it was possible to register every single iceberg during the period of navigation in the ice zone. These observations provided valuable data concerning the principal routes of icebergs, the regions of their most intensive formation, the boundaries of their distribution, and the duration of their existence.

Observations of this type are of great interest for the solution of such an important geophysical problem as the balance of matter in the huge ice sheet covering the antarctic continent.

Information of the characteristics of distribution and movement of icebergs is one of the major conditions in ensuring safety of navigation in Antarctic waters. However, the icebergs in the Antarctic are not only a navigational hazard. The floating icebergs may be used widely by navigators in solving many important problems. For example, since the speed of movement of the large icebergs is generally not very great, and their transfer from one place to another during short periods of time is often very close to the computations made by navigators, the Ob' constantly made use of the floating icebergs to determine the location of the ship. During navigation in Antarctic waters, where the weather is always cloudy, with frequent fog or snowfall, the ship frequently had to change its course; while it was impossible at such times to use the log because of the ice, the indicated method of iceberg observation gave excellent results.

Icebergs may serve navigators also in the event ships have to force their way through closely packed drift ice. Since the icebergs are deeply immersed in the water, they move mainly under the influence of the current, while sea ice moves according to the wind. In the event of strong wind, sea ice moves faster and areas of open water form in the lee of icebergs, which have been called "water shadows." If the icebergs are large in size and there is a great number of them, the "water shadows" blend into each other and form huge polynyas, extending over many miles. These polynyas are very durable and can be used successfully to overcome heavily packed ice.

In navigational practice, it is extremely important to establish a relation between the icebergs and the drifting sea ice. Under certain conditions, icebergs have an enormous effect on the nature and distribution of sea ice, as they may speed up the breaking of shore ice and its being carried out to sea, or on the other hand, they may act as a barrier preventing the shore ice from moving out.

The ice reconnaissance and research work conducted on the Ob' naturally could not cover all the problems posed by science and navigational practice. Together with the research results of previous Soviet Antarctic expeditions, this material must be considered as a continuation of the systematic work being done in studying the ice regime of Antarctic waters. ("Icebergs in the Service of Navigation"; Moscow, Vodnyy Transport, 18 Apr 59)

Beginning of Antarctic Winter Season

The polar night in the interior of Antarctica has set in. On 22 April, the sun appeared for the last time in the region of the south geomagnetic pole. The polar scientists wintering at Station Vostok will not see the sun again for 4 monts. The Antarctic winter is already making itself felt on the high-mountain ice plateau where Station Vostok is located. Ye. Yevseyev, meteorologist, recently recorded an air temperature of minus 72.1 degrees Centigrade.

A group of members of the glaciological detachment flew east from Mirnyy to do field research. The LI-2 plane, piloted by P. Rogov, landed the scientists on the Shackleton Ice Shelf. From there, the plane was to carry the party to the ice cupola of Mill Island, located in the same region.

The group arrived on Shackleton Ice Shelf during the daytime. Complex research activities were conducted at this place during a 24-hour period: two test holes were drilled, core samples of ice were taken, and other work was carried out.

A heavy snowstorm began unexpectedly during the night. The wind velocity reached 40 meters per second, and the plane was unable to take off for Mirnyy. The purga continued for 5 days. During a hurricane-force wind, the men had to chop holes through the ice and the plane was anchored in the ice. When the storm died down temporarily, the party returned to Mirnyy.

Interesting observations were conducted by A. Kapitsa and L. Khrushchev, glaciologists, on the ice cupola of Drygalski Island, located in Davis Sea north of Mirnyy. ("The Sun Has Appeared for the Last Time"; Moscow, Vodnyy Transport, 23 Apr 59)

New Antarctic Traverse Is in Progress

A group of members of the Fourth Antarctic Expedition is at present undertaking a sled-tractor traverse into the interior of Antarctica. The scientific research train consists of two "Pingvin" caterpillar tractors towing two sledges with equipment. One of the tractors is equipped with navigational instruments and a radio set.

Seven polar specialists are taking part in this traverse, including A. Khoman'ko, V. Makarov, and V. Ivanov, scientific associates of the Institute of Physics of the Earth, Academy of Sciences USSR; V. M. Lyubarets, radio technician; and M. Petrov and B. Shafaruk, mechanics and drivers. The expedition is headed by S. Sheglov, geophysicist. The group is conducting scientific observations under the program of the IGC-1959 in the fields of geodesy, gravimetry, meteorology, glaciology, and geography. The traverse is scheduled to take slightly over 2 months.

On 24 April, the scientific research train was located 63 kilometers south of Mirnyy. The weather was extremely unfavorable, as there were snowstorms and temperatures of minus 20-25 degrees Centigrade. ("Traverse of 'Pingvin' Vehicles"; Moscow, Vodnyy Transport, 25 Apr 59)

Czech Scientist Returns from Antarctic

Antonin Mkros, the Czech scientist, returned from the Antarctic on the Ob'. He had worked for 16 months as a member of the Third Continental Antarctic Expedition, conducting scientific research at the Mirnyy observatory; he also took part in a sled-tractor traverse into the interior, helped the Soviet polar workers and seamen in setting up the new station Lazarev, and conducted field research in the mountains of Queen Maud Land.

On his return, the Czech scientist visited the office of Glavsevmorput', accompanied by Stanislav Bartl, special correspondent of the Czech youth paper Mlada Fronta, who also made a voyage to the Antarctic on the Ob'. Before returning home, Antonin Mkros and Stanislav Bartl asked that greetings be forwarded to their friends, the Soviet polar scientists and seamen. ("Sincere Greetings to the Polar Workers"; Moscow, Vodnyy Transport, 28 Apr 59)

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